

Description of a New Species of the Genus *Lema* (Coleoptera, Chrysomelidae, Criocerinae) from Honshu, Japan

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Abstract A new species of the genus *Lema* is described from the Hokuriku, Tōkai, Kinki and Chūgoku Districts of Honshu, Japan, under the name of *Lema (Lema) michioi*. This new species apparently resembles *Lema (Lema) dilecta* BALY, 1874, but is easily distinguished by the following characteristics: antennae slenderer, pronotum clearly rectangular and finely shagreened, and undersurface much densely pubescent.

I am going to dedicate the present paper to the late Dr. Michio CHŪJŌ with the highest esteem. I would like to express my sincere gratitude for his constant affectionate encouragement for 40 years since my undergraduate student days. I am deeply proud that I could have learned many matters of entomology from him.

In August 2004 I discovered a population of a small strange criocerine species belonging to the subgenus *Lema* of the genus *Lema* in the rice fallow field of a low-mountainous area at an altitude of about 300 m in Yatsuo-machi, Toyama Prefecture, Hokuriku District, Central Honshu, Japan, where a number of individuals of the species were intensely feeding on *Murdannia keisak* (HASSK.) HAND.-MAZZ. (Commelinaceae). Since the first discovery I have intensively surveyed the species in question at many similar habitats in Toyama Prefecture with my young friend Ms. Yoko MATSUMURA. We were able to find many populations of the species in fallow and abandoned rice fields, marginal areas of cultivated rice fields, surroundings of natural and irrigation ponds, damp areas, and other similar habitats where many aquatic and sub-aquatic plants occasionally grow well. The species in question apparently resembles *Lema (Lema) dilecta* BALY, 1873, but it is clearly distinguished from the latter by several morphological characteristics. After careful examination, I reached the conclusion that the species should be regarded as a new species.

I suppose that this new species generally prefers to inhabit those rather wet habitats mentioned above where *Murdannia* plants grow well. I also assume that the species must be distributed in wider region than the localities in Toyama Prefecture that will be recorded in this paper. During only three months since the first discovery of this new species, I could have a good chance to examine several important collections of the Chrysomelidae preserved in the Museum of Nature and Human Activities, Hyōgo, through the courtesy of Dr. Yoshihisa SAWADA. Fortunately, I was able to find

seven specimens that could be regarded as belonging to this new species in the cabinets. After that, I have asked several other entomologists of various districts about the species in question. At my request the following entomologists kindly sent me the specimens showing the characteristics of the new species: Dr. Masakazu HAYASHI of Gobius (Shinjiko Nature Museum, Shimane), Dr. Shigehiko SHIYAKE (Osaka Museum of Natural History), Mr. Yukihiro HIRANO (Odawara), and Mr. Takaaki AONO (Kurashiki). Moreover, I became aware that one out of two specimens collected in Aichi Prefecture, Tōkai District, by Mr. HIRANO showed the external morphology nearly completely identical with that of the species in question, except for the leg coloration; i.e., the specimen had nearly completely yellowish legs including femora. I therefore re-examined all the specimens at my hand and found that a total of 10 specimens collected at three localities of Toyama Prefecture had the same leg coloration as the specimen from Aichi Prefecture. Dr. SAWADA and Dr. SHIYAKE kindly re-examined their collections and sent me many additional specimens that were regarded as the same type of the species with yellowish legs.

Abbreviations of the names of museums and private collections, which are concerned with the type specimens, used in this paper are as follows:

GSNM: Gobius, Shinjiko Nature Museum, Shimane; Dr. M. HAYASHI

KMNH: Kurashiki Museum of Natural History, Kurashiki; Dr. Y. OKUSHIMA & Mr. T. AONO

MNHA: Museum of Nature and Human Activities, Hyōgo; Dr. Y. SAWADA

OMNH: Osaka Museum of Natural History, Osaka; Dr. S. SHIYAKE

YH: Collection of Mr. Y. HIRANO

The people responsible for the loan are given after the names of the institutions. Specimens without acronyms are in my collection, now deposited in my laboratory of the Department of Biology, Faculty of Science, Toyama University.

For abbreviations of the names of organs and/or their parts of the internal reproductive systems of both sexes and hind wing venation in the following description, see SUZUKI (1988, 1994), respectively.

Before going into further details, I wish to express my deep appreciation to Dr. Shun-Ichi UENO, National Science Museum (Nat. Hist.), Tokyo, for his critical reading of the manuscript, and to Ms. Y. MATSUMURA for her collaboration and help in my field survey of this species. My deep gratitude should be expressed to Mr. T. AONO, Dr. M. HAYASHI, Mr. Y. HIRANO, Dr. Y. OKUSHIMA, Dr. Y. SAWADA, and Dr. S. SHIYAKE for their kind help in various ways and the loan of valuable specimens. I also thank Prof. N. NARUHASHI for identification of host plants and Mr. I. KAWASHIMA for preparation of several beautiful text figures.

Lema (Lema) michioi K. SUZUKI, sp. nov.

[Japanese name: Ko-ruri-kubiboso-hamushi]

(Figs. 1, 3-8)

This new species apparently resembles *Lema (Lema) dilecta* BALY, 1874 (Fig. 2) but is easily distinguished by the following characteristics: antennae slenderer, pronotum clearly rectangular and finely shagreened, and undersurface much densely pubes-

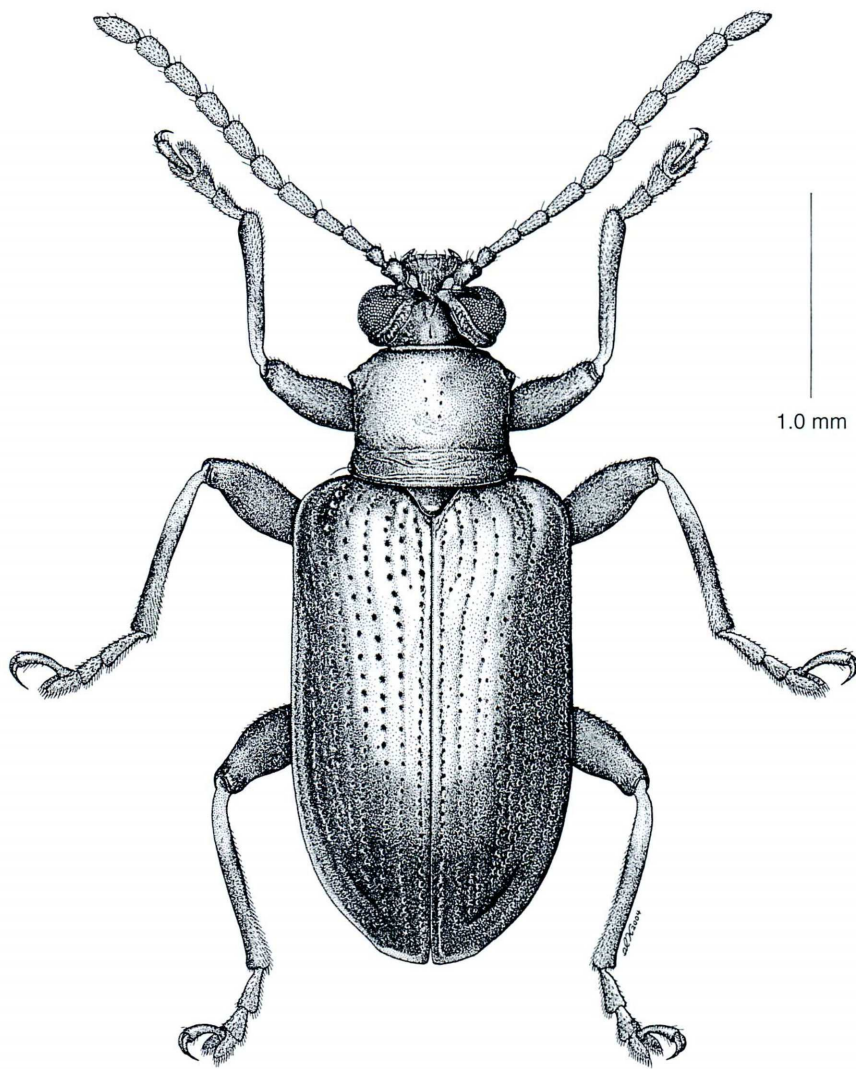


Fig. 1. *Lema (Lema) michioi* K. SUZUKI, sp. nov. (holotype, ♂), from Kiritani, Yatsuo-machi, Toyama Pref., Honshu.

cent.

Body smaller in size among the genus *Lema*, elongate-oblong, subparallel-sided.

Body coloration:— General color metallic cyaneous, rarely subdued brownish black with slightly bluish or greenish luster, with all legs yellowish brown to dark brownish black except for femora dark brownish brown to pitchy black or almost pale yellow to yellowish brown including femora, i.e., legs showing distinct dichromatism. Undersurface almost dark cyaneous. Head capsule almost dark metallic cyaneous; central part of vertex tinged with orange yellow to dark reddish brown in various size and shape; frontal tubercles dark metallic cyaneous to metallic black; clypeus dark metallic cyaneous to metallic black; labrum dark metallic cyaneous to metallic black; mandibles metallic pitchy black with apical 1/3 dark reddish brown; maxillary and labial palpi dark reddish brown; antennae dark reddish brown to brownish black, with the basal half of 2nd segment paler, 3rd to 11th segments apparently frosted black, with each base occasionally dark reddish brown; neck-region dark metallic cyaneous, with the basal half of gular plate pale yellowish brown. Prothorax deep metallic cyaneous to dark brownish black. Legs divided into two distinct types in their coloration as follows: Type 1 (nominotypical form; holotype belongs to this form) — trochanters metallic black, femora dark brownish black, with parts near apices pale to dark yellowish brown, tibiae yellowish to dark brownish black, with the apical 2/3 to only the apical extremities and the inner upper edges dark brownish brown to almost pitchy black, and 3rd tarsal segment and claws occasionally almost pitchy black, and Type 2 (f. *hiranoi*) — all legs pale yellow to pale reddish yellow, with trochanters metallic black, apices of femora, tibiae, and all tarsal segments including claws dark brownish brown to pitchy brown.

Head:— Post-ocular constrictions not connected to each other, acrossing the dorsal surface; frontal groove deep, shaped like a temple-bell, completely connected to the post-ocular groove at the posterior end; frons distinctly convex, rather entirely prominent, very finely punctate; neck-region cylindrical, extremely finely shagreened; frontal tubercles subquadrate, almost glabrous; clypeus nearly obpentagonal, with front margin gently curved anteriad, weakly hollowed in the middle, finely shagreened, roughly covered with short whitish bristle-like hairs, and lateral 1/4 of its apical 2/3 roughly covered with several long whitish bristle-like hairs. Mouth-parts:— Labrum transverse, with front margin shallowly emarginate at the middle, with three or four pairs of long whitish bristle-like hairs on each baso-lateral area; maxillary palpi slender, with last segment strongly elongate-conical, bluntly pointed at the apex and not thicker than the penultimate segment. Eyes large, with the inner margin strongly and subtriangularly notched. Antennae filiform, about half the length of body; 1st and 2nd segments almost glabrous, 3rd to 11th segments densely covered with a number of fine and several long whitish hairs, 1st segment very strongly thickened and longer than wide, 2nd the shortest, and 11th the longest, nearly equal in length. Neck-region:— Uppersurface finely shagreened, undersurface almost glabrous.

Pronotum subquadrate, widest at a little behind the front margin, strongly con-

stricted on each side at, or just behind, the middle; dorsum strongly transversely convex, very finely shagreened, sparsely covered with fine punctures on each latero-anterior area, with a distinct transverse impression, which is nearly straight or weakly curved posteriad and terminating laterally into the posterior portion of lateral constriction between the middle and base, front margin very weakly curved anteriorly, basal margin gently curved posteriad. Scutellum small, with the apical margin weakly rounded, slightly convex and almost glabrous except for latero-basal area pubescent-punctate.

Elytra elongate, slightly narrowed posteriad; dorsum convex, with a distinct but shallow oblique depression inside the humerus, regularly and rather deeply punctate in ten longitudinal rows on each elytron, with another short row of several similar large punctures along the basal part of suture, interstices of these regular longitudinal rows of large punctures sparsely bearing fine pubescent-punctures between rows of large punctures.

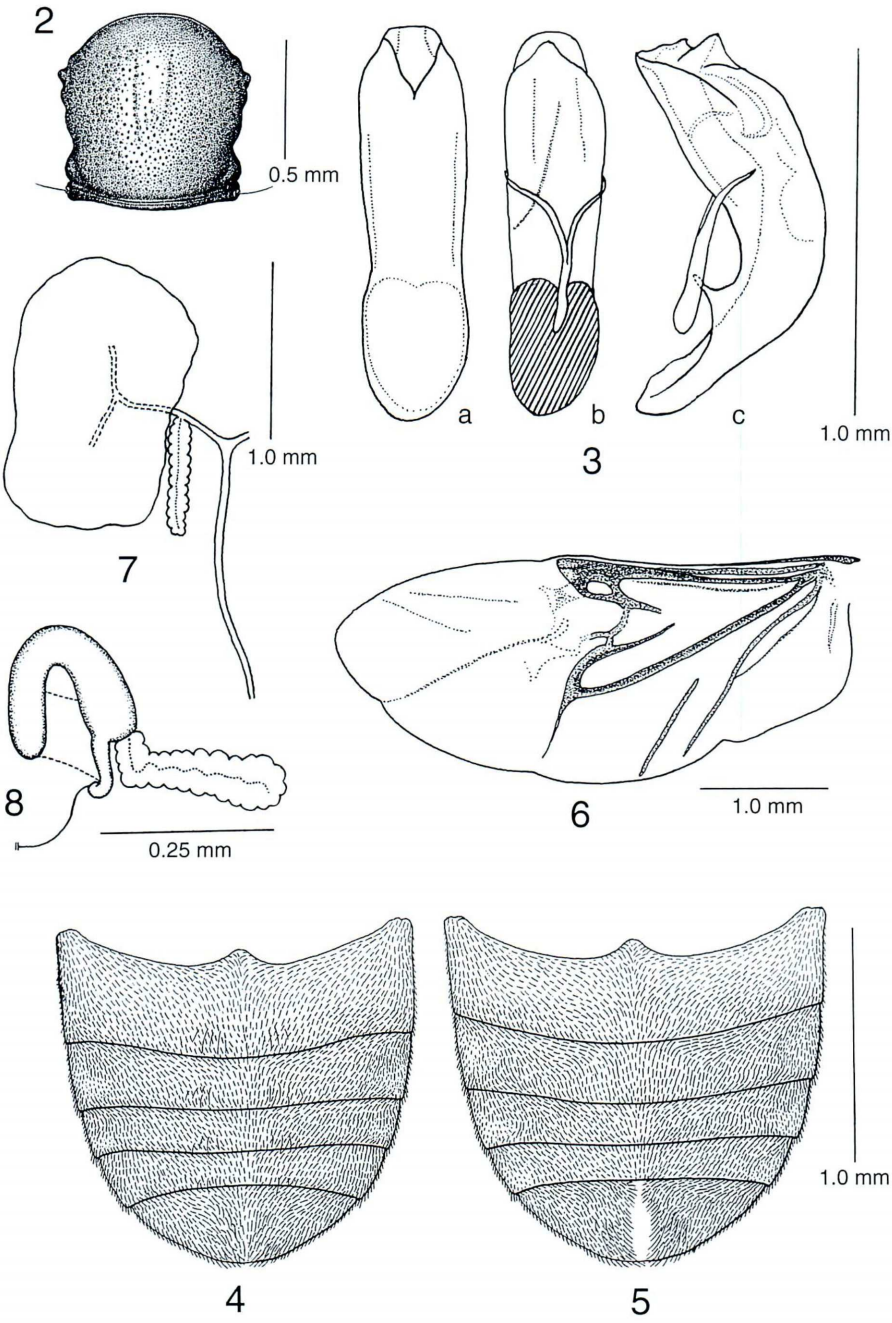
Undersurface nearly completely densely pubescent except for the central subpentagonal area of metasternum, reverse long drop-like area on the mesal part of 1st abdominal sternite, and in female the mesal area of 5th abdominal sternite weakly depressed, distinctly almost glabrous. Claws rather slender, gently obliquely truncated at the apex.

Male genitalia (Fig. 3):—Median lobe well sclerotized, tubular, strongly curved ventrad, forming two arches at its ventral surface, with the ventral edge of median orifice rounded and slightly projecting beyond the dorsal edge, median foramen occupying the greater part of ventral surface of the basal half. Tegmen well sclerotized, consisting of a Y-shaped piece and dorsal part weakly sclerotized and semi-membranous, with flattened weakly sclerotized and semi-membranous tegmental strut (basal piece), without any trace of the distal lobe.

Male internal reproductive system (Fig. 7):—Typical system in the Criocerinae; i.e., it consists of a pair of testes, a pair of vasa deferentia, a pair of accessory glands, and an ejaculatory duct. Testis large, straw-rice-bag-shaped; each testis consists of two assemblages of sperm tubes. Vas deferens very short, about half as wide as testis. Accessory gland short, about half as long as the major axis of testis. Apical part of ejaculatory duct forked into two short lateral ejaculatory ducts; ejaculatory duct tapering towards the base.

Female internal reproductive system:—Typical system in the Criocerinae. Seven ovarioles per ovary. Spermathecal organ (Fig. 8):—Spermathecal capsule: strongly sclerotized; distal part hook-shaped; proximal part simple, weakly crooked tube with the weakly swollen base to which spermathecal gland and spermathecal duct are con-

Figs. 2–8. — 2. Pronotum of *Lema (Lema) dilecta* BALY, 1874 (from Toyama Pref.). — 3–8. *Lema (Lema) michioi*; 3, male genitalia (a, dorsal, b, ventral, c, lateral views); 4–5, pubescence on abdominal sternites (4, ♂; 5, ♀); 6, left hind wing; 7, male internal reproductive system; 8, spermathecal organ.



nected; spermathecal gland, short, somewhat longer than the length of spermathecal capsule, opening into the basal extremity of distal part of spermathecal capsule; spermathecal duct weakly sclerotized, very long, nearly as long as the whole length of body.

Hind wing venation (Fig. 6):—Typical venation in the Criocerinae. Cu_{1a} not forked secondarily and completely isolated from Cu_{1b} ; Cu_{1b} not forming 2Cuc; Pcu directly associated with Cu_{1b} to form 1Cuc, disappearing after associated with Cu_{1b} .

A sex difference besides reproductive systems:—Whole surface of 5th abdominal sternite finely pubescent in male (Fig. 4) but not pubescent around the mesal area in female (Fig. 5).

Measurement in mm. Body length (from anterior margin of frons to elytral apices): ♂, 3.70–4.10; ♀, 3.80–4.50. Maximum width of head (including eyes): ♂, 0.75–0.85; ♀, 0.80–0.90. Antennae length: ♂, 2.05–2.25; ♀, 2.05–2.25. Pronotum length (along the mid-line): ♂, 0.70–0.80; ♀, 0.75–0.85. Maximum width of pronotum: ♂, 0.75–0.90; ♀, 0.85–0.95. Elytra length: ♂, 2.60–2.80; ♀, 2.70–2.95. Elytra width: ♂, 1.50–1.60; ♀, 1.55–1.65. Hind tibiae length: ♂, 0.95–1.05; ♀, 1.00–1.10. Relative length of each of 1st to 11th antennal segments to 1st segment:—1.00 : 0.75 : 1.15 : 1.10 : 1.45 : 1.30 : 1.30 : 1.25 : 1.45 : 1.20 : 1.65.

Type series. Holotype: ♂ (NSMT-I-C200036), allotype: ♀, Kiritani, 300 m alt., Yatsuo-machi, Nei-gun, Toyama Pref., Hokuriku District, Northern side of Central Japan, 18~19-VIII-2004, K. SUZUKI & Y. MATSUMURA leg. Paratypes: Toyama Pref. (Hokuriku District) — 63♂♂, 68♀♀ (incl. 2♀♀ f. *hiranoi*), same data as for the holotype; 31♂♂, 18♀♀, same locality as for the holotype, 10-IX-2004, K. SUZUKI & Y. MATSUMURA leg.; 2♀♀, same locality as for the holotype, 24-X-2004, K. SUZUKI & Y. MATSUMURA leg.; 2♂♂, Oo-nagatani, 400 m alt., Yatsuo-machi, Nei-gun, 16-IX-2004, K. SUZUKI & Y. MATSUMURA leg.; 21♂♂, 31♀♀, Hanamizu-dani, 50 m alt., Shin-machi, Fuchû-machi, Nei-gun, 24-VIII-2004, K. SUZUKI & Y. MATSUMURA leg.; 1♂, 1♀ (both belonging to f. *hiranoi*), Jôganji, 10 m alt., Toyama-shi, 28-VIII-2004, K. SUZUKI leg.; 5♂♂, 2♀♀, Matsunoki, 10 m alt., Toyama-shi, 22-VIII-2004, K. SUZUKI & Y. MATSUMURA leg.; 24♂♂, 16♀♀, same locality, 11-IX-2004, K. SUZUKI & Y. MATSUMURA leg.; 38♂♂, 41♀♀ (incl. 3♂♂, 3♀♀ f. *hiranoi*), Tajiri-ike, 50 m alt., Toyama-shi, 12-IX-2004, Y. MATSUMURA leg.; 4♂♂, 2♀♀, Hama-kurosaki, 0 m alt., Toyama-shi, 25-VIII-2004, K. SUZUKI leg.; 2♂♂, 6♀♀, Araya, 0 m alt., Toyama-shi, 29-VIII-2004, K. SUZUKI leg.; 5♂♂, 12♀♀, Mizuhashi (Ichie), 0 m alt., Toyama-shi, 25-VIII-2004, K. SUZUKI leg.; 3♂♂, 7♀♀, Aso, 300 m alt., Kamiichi-machi, Naka-Niikawa-gun, 28-VIII-2004, K. SUZUKI leg. Aichi Pref. (Tôkai District) — 1♂, 1♀ (♀ f. *hiranoi*), Nukata-machi, Nukata-gun, 3-VIII-2000, Y. HIRANO leg. (YH). Hyôgo Pref. (Kinki District) — 1♀, Tanigami, Kôbe-shi, 1-VI-1986, T. TAKAHASHI leg. (MNH: T. TAKAHASHI collection); 5♂♂, 5♀♀ (incl. 3♂♂, 1♀ f. *hiranoi*), Hitokura, Kawanishi-shi, 8-IX-1996, K. MORI leg. (MNH: T. TAKAHASHI collection); 14♂♂, 24♀♀ (incl. 8♂♂, 18♀♀ f. *hiranoi*), Takarazuka-shi, 7-IV-1951, M. GOTÔ leg. (OMNH: M. GOTOH collection; 1♀ of 12 pinned specimens of nominotypical form

with a label identified as *Lema dilecta* BALY determined by M. GOTÔ and 1 ♀ of 26 ones of f. *hiranoi* with a label identified as *Lema tristis* (HERBST) determined by M. GOTÔ. Shimane Pref. (Chûgoku District) — 1 ♀, Oogaki-chô, Matsue-shi, 25–VI–2003, M. HAYASHI leg. (GSNM). Okayama Pref. (Chûgoku District) — 1 ♀, Kojimashirao, 150 m alt., Kurashiki-shi, 14–VII–1990, T. AONO leg. (KMNH); 1 ♀, Kuroo, Sôja-shi, 12–V–2002, H. SUENAGA leg. (KMNH).

The holotype, allotype and several paratypes are deposited in the collection of the Department of Zoology, National Science Museum (Nat. Hist.), Tokyo. All the paratypes besides those from Toyama Prefecture will be preserved in the museums and private collections, from which I borrowed and examined them, after the publication of this paper: Museum of Nature and Human Activities, Hyôgo (11 paratypes); Osaka Museum of Natural History, Osaka (38 paratypes); Gobius (Shinjiko Nature Museum), Shimane (1 paratype); Kurashiki Museum of Natural History, Kurashiki (2 paratypes); Y. HIRANO collection, Odawara (2 paratypes). Four paratypes from Toyama Prefecture will be preserved in the Toyama Science Museum, Toyama. All the remaining paratypes will be preserved in my private collection, now deposited in my laboratory of the Department of Biology, Faculty of Science, Toyama University.

Distribution. Honshu [Hokuriku (Toyama Pref.), Tôkai (Aichi Pref.), Kinki (Hyôgo Pref.), and Chûgoku (Shimane and Okayama Prefs.) Districts], Japan.

Etymology. This species is named in honor of the late Dr. Michio CHÛJÔ.

Host plant. *Murdannia keisak* (HASSK.) HAND.-MAZZ. (Commelinaceae) [Japanese name: Ibo-kusa].

Notes on the host plants. In the field observation by Ms. MATSUMURA and I, this new species feeds on *Murdannia keisak* only. Ms. MATSUMURA attempted to rear several pairs of this species collected on this host plant in the laboratory and she succeeded to make them lay eggs and emerge new adults from the eggs. Further, when she gave *Commelina communis* L. (Commelinaceae), which was generally found with *Murdannia keisak*, she confirmed that this new species fed on it, though in the natural condition and at least during the late summer to autumn in Toyama Prefecture, Hokuriku District, they seem usually to feed on *Murdannia keisak* only.

Notes on the intraspecific variation of body coloration. I was able to examine more than 450 specimens collected from various localities of four districts (Hokuriku, Tôkai, Kinki, and Chûgoku) in Honshu. Almost all the specimens were cyaneous in general body color, but several were dark brownish black that occasionally occurred in other *Lema* species.

***Lema (Lema) michioi* K. SUZUKI, forma *hiranoi* nov.**

This forma can be easily distinguished from the nominotypical one by having nearly completely pale yellow to pale reddish yellow legs except for trochanters metallic black, the apices of femora, tibiae, and tarsi dark brownish brown to pitchy brown. I found that a total of 41 specimens out of more than 450 ones examined belonged to

this forma. The forma has hitherto been found at three localities in Toyama Prefecture (Hokuriku District), one locality in Aichi Prefecture (Tôkai District), and two localities in Hyôgo Prefecture (Kinki District). The occurrence frequency of f. *hiranoi* seems to differ from population to population. In Toyama Prefecture it was below 10%; i.e., only 2 ♀♀ out of 96 ♂♂, 89 ♀♀ (below 2%) from the Kiritani population and 3 ♂♂, 3 ♀♀ out of 38 ♂♂, 41 ♀♀ (ca. 7%) from the Tajiri-ike population belong to f. *hiranoi*. On the contrary, occurrence frequency of f. *hiranoi* at two localities of Hyôgo Prefecture was obviously high; i.e., 3 ♂♂, 1 ♀ out of 5 ♂♂, 5 ♀♀ (40%) from the Kawanishi-shi population and 8 ♂♂, 18 ♀♀ out of 14 ♂♂, 24 ♀♀ (68%) from the Takarazuka-shi population belong to f. *hiranoi*.

要 約

鈴木邦雄：本州産クビボソハムシ属 *Lema* の1新種の記載。—— 本州の北陸・東海・近畿・中国地方の各地から得られたクビボソハムシ属 *Lema* (ハムシ科, クビナガハムシ亜科) の小型種を、新種として *Lema (Lema) michioi* の名のもとに記載した。和名は、「コルリクビボソハムシ」としたい。本種は、外見上、スゲクビボソハムシ *L. (Lema) dilecta* BALY, 1874 に似ているが、前胸背板の形状（やや横長で、ほぼ全面が、とくに基部 1/4 は明瞭に、弱い鮫肌状、基底部に沿う中央部に浅いが明瞭な横溝が走り、基底部より上方ほぼ 1/4 にほぼ直線状あるいは下方にやや凹状の明瞭な横溝が走ることなど）や腹部腹面のほぼ全面が密生した毛で覆われていることなどによって明瞭に区別できる。筆者は、本種が富山県下では平地～低山帯の放棄水田や休耕水田、水田や池沼周辺部、さらに湿地帯などに普通に生育するイボクサ *Murdannia keisak* (HASSK.) HAND.-MAZZ. (ツユクサ科) を寄主としてかなり普遍的に生息していることから、より広範な生息分布域をもつものと推測し、各地の研究者の協力を仰いだ結果、愛知県額田郡額田町、兵庫県神戸市・川西市および宝塚市、島根県松江市、および岡山県倉敷市および総社市で採集された標本を確認することができた。また、本種の脚は、通常は全脚の腿節がほぼ黒褐色で脛・付節の基半部が暗黄褐色を呈するが、全脚が転節および脛節基端部を除き全体ほぼ淡黄色～淡赤黄色の個体も出現する。後者の型を f. *hiranoi* (黄脚型) と命名した。この黄脚型は、筆者が検した 450 個体以上の標本のうち、富山・愛知・兵庫 3 県から計 41 個体得られており、その出現頻度は地域や集団によって異なるようで、今後の詳しい調査が期待される。この黄脚型は、通常の型のものよりいっそうスゲクビボソハムシに概観が酷似しているので、それと混同されてきた可能性が高い。通常の外部諸形態のほか、雌雄の内部生殖器官系や後翅翅脈相についても記載するとともに、体色変異や寄主植物などについてもこれまでに判明した事実の概要を報告した。

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